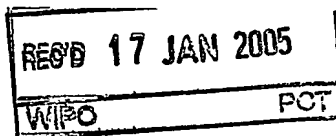


# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)





Applicant's or agent's file reference 62955A		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/40722	International filing date (day/month/year) 19.12.2003	Priority date (day/month/year) 23.12.2002	
International Patent Classification (IPC) or both national classification and IPC C08K7/06, C08L67/00, C08J5/04			
Applicant DOW GLOBAL TECHNOLOGIES INC. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  22.06.2004	Date of completion of this report  14.01.2005
Name and mailing address of the International preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Meiners, C  Telephone No. +49 89 2399-6056 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/US 03/40722**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-15 as originally filed

**Claims, Numbers**

1-11 received on 01.11.2004 with letter of 01.11.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

**see separate sheet**

6. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/US 03/40722**

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	2 - 5
	No: Claims	1, 6 - 11
Inventive step (IS)	Yes: Claims	-
	No: Claims	1 - 11
Industrial applicability (IA)	Yes: Claims	1 - 11
	No: Claims	-

**2. Citations and explanations**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/US 03/40722

**Re Item I**

**1. Basis of the report**

- 1.1 The amendments filed with the letter dated 01.11.2004 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are the following: the application as originally filed does not disclose that the carbon nanotubes have a diameter of 200 microns or less. However, amended claim 1 filed with the letter dated 01.11.2004 specifies that the carbon nanotubes have a diameter of 200 microns or less.
- 1.2 Thus, this international preliminary examination report has been established on the basis of the application as originally filed, *i.e.* pages 1 - 15 and claims 1, - 11.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**Cited documents:**

- D1: EP-A-0 589 640 (GEN ELECTRIC) 30 March 1994 (1994-03-30)  
D2: WO 01/53379 A (WINCKLER STEVEN J ; CYCLICS CORP (US);  
TAKEKOSHI TOHRU (US)) 26 July 2001 (2001-07-26)

**2. Novelty (Art. 33(2) PCT)**

- 2.1 Document D1 claims compositions comprising a resinous base (A) comprising (A-1) a macrocyclic oligomer composition capable of conversion to a linear polymer, and (A-2) a high molecular weight linear polymer comprising structural units identical to those in the macrocyclic oligomer composition. Furthermore, the compositions comprise about 15 - 50 weight-% (based on the total of components A and B) of fibers having an aspect ratio in the range of about 500 - 800 plus a catalyst (C) for the polymerization of the macrocyclic oligomers (A-1) (D1, claim 1).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/40722

Claim 3 of D1 specifies that the fibers (B) can be carbon fibers. Also disclosed in D1 are the fiber-reinforced thermoplastic articles derived from the compositions (D1, claims 9 and 11). The compositions of D1 can be molded at 250 - 300 °C (D1, page 4, lines 42 - 54).

Since the term "nanofiber" of claim 1 of the present application is not clear (is the diameter and/or length of the fibers nanoscaled?), this technical feature is not considered for the assessment of novelty. Furthermore, the polyesters produced from components (A-1) and (A-2) are identical to polymers manufactured only from macrocyclic oligomers (A-1) due to the identical structural units of (A-1) and (A-2).

D2 discloses compositions comprising carbon fibers, macrocyclic polyester oligomers, and a polymerization catalyst (D2, examples 12, 14, and 17). It is also stated in D2 that macrocyclic polyester oligomers have a low viscosity and easily wet fibers (D2: paragraphs 0004 and 0093). The fillers used in the compositions of D2 include materials which exhibit e.g. conductivity (D2: paragraph 0034). The preregs of example 14 of D2 are compression molded at about 200°C.

- 2.2 Thus, the subject-matter of claims 1 and 6 - 11 is considered to be anticipated by D1 and D2 and does therefore not meet the requirements of Art. 33(2) PCT.

**3. Inventive Step (Art. 33(3) PCT)**

- 3.1 The subject-matter of claims 1 and 6 - 11 of the present application is not novel and therefore also not inventive in the sense of Art. 33(3) PCT.
- 3.2 In view of D2 as closest prior art, dependent claims 2 - 5 of the present application do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Art. 33(3) PCT), since no unexpected technical effect can be ascribed to the presence of the additional features of claims 2 - 5.

**4. Industrial Applicability (Art. 33(4) PCT)**

- 4.1 The subject-matter of claims 1 - 11 of the present application is industrially applicable.

**5. Clarity of the claims (Art. 6 PCT)**

- 5.1 Claim 1: it is not clear what is meant by "a network of loosely associated nanofibers".

In another aspect, the term "nanofibers" is not a clearly defined technical feature, because it is not stated to which dimension of the fibers the term "nano" relates.

It appears that the feature "a conductivity of  $1 \times 10^{-5}$  S/cm" is incomplete: see page 2, lines 17 - 18 of the present application, stating that the composition 'demonstrates' a conductivity of  $1 \times 10^{-5}$  S/cm or greater.

- 5.2 Claim 9: the macrocyclic oligomers are already cyclic.

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# Amended Claims

1. A composition comprising
  - a) a polymer derived from a macrocyclic oligomer; and
  - b) one or more networks of carbon nanotubes having a diameter of 200 microns or less wherein the networks of carbon nanotubes are dispersed in the polymer matrix and carbon nanotubes are present in an amount such that the composition demonstrates a conductivity of  $1 \times 10^{-5}$  S/cm or greater.
2. Compositions according to Claim 1 which further comprise a polyfunctional chain extending agent.
3. Compositions according to Claim 1 which further comprise a core shell rubber.
4. Compositions according to Claim 3 wherein the core shell rubber has functional groups on the surface of a core shell rubber.
5. Compositions according to Claim 1 which further comprise a polyfunctional active hydrogen-containing polymer.
6. Compositions according to Claim 1 which comprise
  - a) from 50 to 98 parts per hundred by weight of the composition of polymer matrix, and
  - b) from 2 to less than 15 parts per hundred parts by weight of the composition of networks of carbon nanotubes.
7. Compositions according to Claim 1 wherein the aspect ratio of the carbon nanotubes is 150 or greater.
8. A composition according to Claim 1 wherein the polymer matrix comprises a polyester derived from macrocyclic oligoesters.
9. A process according to any one of Claims 1 to 8 for the preparation of a polymer matrix having dispersed therein one or more networks of carbon nanotubes which comprises contacting the networks of carbon nanotubes with molten macrocyclic oligomer and a catalyst for polymerization of the macrocyclic oligomer under conditions that the macrocyclic oligomer decyclizes and polymerizes with the networks of carbon nanotubes dispersed therein.

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10. The process of Claim 9 wherein the temperature of the reaction mixture is 150°C to about 300°C.

11. A molded article comprising the composition of any one of Claims 1 to 8.